ART. II.—*Clinical Report on Hydro-Peritoneum, based on an analysis of forty-six cases.* By AUSTIN FLINT, M. D., Prof. of the Principles and Practice of Medicine in the Bellevue Hospital Medical College, N. Y., and in the Long Island College Hospital.

THE term *hydro-peritoneum* is applicable only to a purely dropsical or serous effusion into the peritoneal sac. The term *ascites* should perhaps be used in the same restricted sense, but writers are accustomed to apply this term to an inflammatory, as well as a dropsical, effusion. The two forms of effusion being pathologically distinct, they should be studied separately, and I shall limit myself in this article to the latter form; that is, to the non-inflammatory or dropsical effusion. Excluding cases in which liquid (serum and lymph) accumulates in the peritoneal sac as a result of peritonitis, most of the cases in which effusion accompanies carcinomatous deposit will also be excluded, the effusion in these cases being generally due to superadded peritoneal inflammation. Hydro-peritoneum occurs in connection with anasarca dependent, generally, on either renal or cardiac disease, or on the two combined. I shall exclude the consideration of cases in which peritoneal is only an element of general dropsy, and confine myself to hydro-peritoneum considered as a local affection.

The clinical study of hydro-peritoneum offers several interesting questions. The first point to which attention will be directed is the causation of the affection. The affection is secondary, and dependent, as is well known, in a large majority of cases, on disease of the liver. Questions of interest have reference to its connection with hepatic and other morbid conditions, and also to remote causes co-operating with the conditions on which the dropsy is immediately dependent. Other points of inquiry relate to the symptomatology of the affection, to its progress and termination, the prognosis, and the management. I shall consider the subject so far, and so far only, as the questions embraced in its clinical study may be elucidated by the facts contained in the recorded histories of forty-six cases. I have recorded these cases during the last thirteen years. A very large proportion, viz., 37, were observed in hospital practice; 2 cases were in dispensary, and 7 in private practice. They were observed in different places, as follows: 10 cases in Buffalo, N. Y.; 5 cases in Louisville, Ky.; 11 cases in New Orleans, La., and 20 cases in the cities of New York and Brooklyn. Some of the histories are incomplete, the patients having passed from my observation prior to the termination of the affection. The histories vary, also, as regards completeness in details while the cases were under my observation. Such as they are, I shall analyze them and give the results in treating of the different branches of the subject. In a considerable proportion (24) of the cases a fatal termination either occurred while the patients were under my observation, or the death of the patient

was ascertained. A certain proportion of the remaining 22 cases doubtless ended fatally after the patients had passed from my observation. But for convenience of reference I shall include the latter under the head of non-fatal cases. The prognosis will be one of the topics for consideration, and it will be seen in that connection that the instances in which a permanent recovery was known to take place are very few.

CAUSATION OF HYDRO-PERITONEUM.—The causation embraces, as just stated, the proximate morbid conditions giving rise to the dropsy, and the remote causes producing the morbid conditions on which the dropsy immediately depends, and, also, accessory causes. The proximate morbid conditions are to be ascertained mainly by examinations after death. What are the changes found in fatal cases which, from their constancy and character, may be considered as standing in an immediate causative relation to the dropsical effusion? With reference to this question I will proceed to interrogate the fatal cases in my collection in which post-mortem examinations were made.

Examinations after death were made in 14 cases. In each of these cases the liver presented morbid changes. This organ was reduced in volume in 13 of these cases; its volume was increased in one case only. The degree of reduction varied, being in some cases moderate, in other cases considerable, and in one case very great. The weight in all but two of the cases in which the organ was weighed, was diminished below the limit of the variations of health. It was weighed in 10 cases. In one the weight was 3 lbs. 9 oz., which is not perhaps sufficiently below the normal average to be considered as necessarily abnormal. In the remaining 9 cases, the weight varied from 2 lbs. to 3¼ lbs. The organ was not weighed in the case in which the reduction in volume, and, probably, also in weight, was greatest. The gross appearances, aside from the volume, differed considerably in different cases. In 8 cases the organ was not altered notably in form, and the external surface was everywhere smooth. In 1 case the deformity was great although the surface was smooth. In 5 cases the surface was nodulated and the form more or less altered. In one case the deformation was so great that the organ would not have been recognized. Of this case I shall give an account presently. The external appearances in the other four cases are thus described:—

CASE 1. "Surface irregularly nodulated, the projecting portions varying in size from that of a pea to a filbert, and of a dark greenish colour."

CASE 2. "Whole surface studded with nodules varying in size, presenting a hob-nail appearance, the nodulated portions parenchymatous and the intervening spaces fibroid."

CASE 3. "Surface irregular."

CASE 4. "Liver studded with hob-nail eminences."

In one case a little lymph was observed on the convex surface of the

organ. The appearance, on section, of the cut surfaces, is described in several cases as granular. In one case the nutmeg appearance was marked. In one case it is noted that the "cut surfaces presented irregularly shaped portions of variable size and of a dark green colour, with white hard spots and white lines irregularly disposed." The granular portions were in some cases yellow. It is noted in one case that "on section the surfaces present an appearance as if studded with yellow granules of the size of pins' heads." In one of the cases the cut surfaces had a mahogany colour, the lobules not being distinctly visible. The two orders of venous radicles, viz., the intra-lobular and the inter-lobular, were sometimes visible and sometimes not apparent. The condition as regards the amount of blood contained in it varied. Generally but little blood or serum flowed when incisions were made; the organ appeared to be dry and anæmic. But in one case there existed marked congestion, blood flowing freely from the cut surfaces. In most cases it is noted that the organ was unusually dense and resisting. As an exception to this rule in one case it is noted as soft and flabby. The microscopical appearances are noted in a few of the cases. In one of these the "liver cells were small, wasted, irregular in shape, and filled with granular matter." In another case the "liver cells contained oil drops and granular matter." In two cases "the liver cells contained oil drops in abundance." In one of these cases the nutmeg appearance was marked. In another case the "liver cells were reduced in size, containing some oil drops and granular matter." In the case in which the liver was enlarged, the liver cells were filled with oil, and the field of the microscope was crowded with oil drops of different sizes. The records are defective as regards the presence of fibrous tissue in the interlobular spaces. Adhesions to adjacent organs are noted in two cases, and in one of these the organ was excessively contracted and deformed. In both cases the surface was universally adherent to the surrounding parts.

These results go to show the constancy with which, in fatal cases of hydro-peritoneum the affection is associated with disease of the liver. They show the frequency of contraction of this organ. They show that the external surface in a certain proportion of cases is nodulated, but that it is oftener smooth; that the cut surfaces generally present a granular appearance; that the colour varies, being either yellowish, greenish, or of a dark brown mahogany colour; that the two kinds of venous radicles may be, or may not be apparent; that the nutmeg appearance is sometimes marked; that the organ is usually dense and resisting, but may be soft and flabby; that it is generally anæmic, but may be congested, and that it is sometimes morbidly adherent to adjacent parts. Notwithstanding these variations in the gross appearances, the essential morbid change in all the cases would be considered as embraced by the term *cirrhosis*. This term, first employed by Laennec when the minute anatomy of the liver was very imperfectly understood, denotes an appearance by no means uniformly pre-

sent, viz., a yellow colour resembling that of impure beeswax. Laennec considered the appearance of yellow granules as due to a peculiar morbid product, bearing an analogy to the tuberculous deposit; other pathologists, regarding the liver as consisting of red and yellow anatomical elements, attributed the change to an hypertrophy of the latter. These ideas have been abandoned, and, now that the normal structure of the organ has been in a great measure elucidated by the researches of Kiernan and others, much light appears to have been shed on the morbid condition in cirrhosis, and the rationale of the peritoneal dropsy dependent thereon. What is the essential morbid condition in cases of so-called cirrhosis? I will devote a few remarks to this question.

I shall offer nothing with reference to the nature of the lesion in cirrhosis, as conclusions drawn from personal researches. This branch of the subject lies within the domain of microscopy. My remarks will relate to the views held by microscopical observers. There is considerable unanimity of opinion, at the present moment, on this point. The primary change is supposed to consist in the exudation of fibrin into the interlobular spaces, and the production of fibrous tissue in this situation. The microscope reveals an abnormal abundance of this tissue, and, indeed, this is often apparently obvious to the naked eye. The contraction of the organ is attributed to the shrinking of this newly formed tissue, and to the atrophy of the lobules or acini caused by its pressure upon them. The dropsy is explained by the pressure of the exudation and newly formed tissue on the terminal branches of the vena portæ, or the interlobular veins, which occupy the same situation, viz., the spaces between the lobules. Pressure upon these venous radicles produces obstruction within the liver of the portal circulation; congestion of the portal vessels of the abdominal viscera follows, and serous transudation occurs as a result of the mechanical pressure on the coats of the vessels incidental to the portal congestion. The nodulated appearance and deformation of the liver arise from the exudation and newly formed tissue being more abundant, or the shrinking and atrophy being greater in some parts than in others. The anæmic appearance and dryness in many cases, together with the wasting of the liver cells, are other consequences of pressure within the liver. The point of departure being the exudation of fibrin, and, this being the great characteristic of inflammation, the morbid process is considered to be inflammatory. Cirrhosis, thus, according to the pathological view just stated, is neither more nor less than a diffused, subacute inflammation of the connective tissue, which is generally supposed to exist in the interlobular spaces, being an extension of Glisson's capsule. This is an epitome of the pathology of cirrhosis, according to the views of most pathologists at the present time. The rationale just given is not, however, accepted by all pathologists. Dr. Beale, of King's College Hospital, London, has offered a different doctrine.[1]

[1] Beale's Archives of Medicine, No. 2, 1858.

He has been led to conclude that the change commences in the cells contained within the lobules of the liver; the cells near the circumference of the lobules being first affected, and the affection extending gradually from the circumference to the centre. As a consequence of the altered condition of the liver cells, he thinks the attractive force inherent in the organ, which determines the flow of portal blood, is lessened; consequently the interlobular veins shrink, and there is an impediment to the portal circulation through the liver. His explanation of the dropsy is the same as that involved in the commonly received doctrine; it is the result of pressure on the walls of the portal vessels incidental to portal congestion. He bases his opinion of the primary, or essential change, on the number of the interlobular vessels, which remain permeable, as shown by injections; and he supposes that the appearance of an abnormal abundance of fibrous tissue may be due to the remains of the wasted and shrunken vessels and ducts, rather than to the presence of an adventitious tissue. According to this doctrine, the pathological process in cirrhosis is not inflammatory, but a degenerative change, having its point of departure in the secreting cells of the liver. I shall not enter into any discussion of these conflicting views. The question is to be settled, not by discussion, but by continued microscopical researches.

Contraction of the liver, apparently from external compression, may give rise to hydro-peritoneum. One of the cases afforded an example of this fact. The following are the important points in the history of this case:—

Caroline E., aged 20, of small size, spine curved, sexual system, including mammæ, undeveloped, was attacked with hæmatemesis, December, 1850. The hemorrhage was copious, but ceased after six hours. She was attended by the late Dr. Wilcox at Buffalo. Another attack of hæmatemesis occurred in January, 1851. In February, 1851, she was supposed to have peritonitis, and mercury was given to ptyalism. About this date the accumulation of liquid in the peritoneal sac commenced. In March, 1851, she had another attack of hæmatemesis. The peritoneal dropsy increased in spite of the use of digitalis and the bitartrate of potassa; and she was tapped in the following month of April. She was tapped again in May following. Vomiting then became a prominent symptom, and she died in June, 1851. On opening the abdomen, and giving exit to a large quantity of transparent liquid, the parts surrounding the liver were closely and firmly adherent to this organ, so as to completely conceal it from view. The adhesions were evidently of long standing. There was no evidence of recent peritonitis. The liver, when the adherent parts were dissected from it, was found to be greatly reduced in size, irregularly lobulated, and so deformed that the organ would not have been recognized. The weight is not noted. The internal structure was not examined. The ovaries were small, smooth, and transparent, containing no corpora lutea. The uterus was extremely small. The patient had never menstruated.

In this case the adhesions of the liver to the surrounding parts were

manifestly of older date than the dropsy; and it is fair to conclude that the exndation of lymph on the surface of the organ had contributed to the atrophy by compression. Bnt it is also to be inferred that disease of the liver existed prior to the serous inflammation, inasmnch as circumscribed peritonitis does not occur, except as secondary to an affection of the viscera with which the affectcd portion of peritoneum is connected.

An important point of inquiry relates to the co-existence of affections of other organs with disease of the liver. What other affections are liable to be concerned, proximately or remotely, in the causation of hydro-peritoneum? This question applies particularly to affections of the spleen, the heart, and the kidneys. The histories of the fatal cases are to be interrogated with reference to these organs.

As regards the *spleen*, in nine of the histories it is not mentioned. I am certain that in most, if not all these cases, this organ was neither notably increased nor diminished in volume. In oue case it is noted to have been small and wrinkled. In two cases the volume was much increased, being larger, and also greater in weight than the liver. In two cases the weight is given, being in one 2 lbs. 13 oz.; and in the other 18 oz. These facts show that notable enlargement of the spleen is the exception rather than the rule, and that the organ is sometimes diminished in size. There is no ground, so far as these facts are concerned, to suppose that enlargement of the spleen plays an important part in the production of peritoneal dropsy. And wheu it is considered how often enlargement of the spleen occurs as a sequel of intermittent fever without the occurrence of dropsy, we must regard it as an error to include this among the causative conditions of hydro-peritoneum. It is so included by most authors of works on the practice of medicine. The infreqnency of enlargement of the spleen in fatal cases of cirrhosis would not be anticipated, and I suspect it is opposed to a general impression among practitioners. It is certainly a reasonable *à priori* inference that a degree of obstruction to the portal circnlation within the liver, giving rise to congestion of the abdominal viscera, sufficiently to occasion dropsical effusion, should induce sufficient congestion of the spleen to increase its size. The fact, however, that the spleen is enlarged in only a small proportion of cases, shows other circumstances than portal obstrnction to be requisite in the production of the enlargement when it does occur.

The condition of the heart is not mentioned in the notes of the autopsies in two cases. Of the remaining ten cases, in two there existed universal, old pericardial adhesions. In one of thcse two cases the heart was enlarged, weighing 14 oz.; in the other case the organ was below the normal size. There was rigidity of the aortic valves and enlargement (weight 11 oz.) in one case. The heart is noted as healthy in all the remaining, viz., in seven cases. These results do not go to snstain a common impression that disease of the heart precedes and has a causative relation to cirrhosis

of the liver. When these two organs are affected together, the association is probably a coincidence only. The physical signs enabling us now to determine positively the existence or absence of cardiac lesions, the question as to the condition of the heart in cases of hydro-peritoneum, will come up again when the histories of the non-fatal cases are considered.

The condition of the kidneys is noted in all but three, that is, in 11 cases. These organs were considered to be healthy in 5 of these ten cases. In the remaining 6 cases they were manifestly diseased. In one case it is simply stated that they presented the appearance of "incipient granular degeneration." In all the other cases they were enlarged and granular. In 2 cases fatty degeneration was marked. Coexisting disease of the kidneys, thus, it would seem, occurs in a sufficiently large proportion of cases to show either some pathological connection between the affection of these organs and of the liver, or that both affections are effects of the same causative conditions. The existence of a relation of causation between the two affections, and, if such a relation exists, the question whether the affection of the kidneys proceeds from disease of the liver, or *vice versa*, are to be determined by ascertaining in a sufficiently large collection of cases which of the affections occurs prior to the other. The facts noted with respect to the autopsies in the fatal cases now under consideration, are insufficient to shed light on these points. The same questions, however, will occur in connection with the histories of the non-fatal cases, inasmuch as the presence of albumen in the urine may be considered as a pretty uniform criterion of the existence of disease of the kidneys. It is worthy of remark that in none of the cases in which disease of the kidneys coexisted, were these organs contracted, a fact which renders the absence of albumen in the urine more reliable as evidence, in cases of hydro-peritoneum, that the kidneys are not diseased, since it is chiefly in cases of contracted kidneys that we meet with the exceptional instances in which albuminuria is wanting.

As regards other organs than the spleen, heart, and kidneys, there existed double pleurisy in one case, with considerable effusion of lymph and serum in both sides. In this case there were old pericardial adhesions, and the kidneys were diseased. In another case there existed œdema of the lungs. In this case, also, old pericardial adhesions existed. In one case there were ulcerations in the large intestine. In one case there was a deposit of lymph beneath the arachnoid on the superior portion of the cerebral hemispheres. The lungs were stated to be healthy in 5 of the cases.

Reviewing the foregoing results, the only constant lesions were in the liver. Undoubtedly this organ is affected in the vast majority of fatal cases of hydro-peritoneum; and undoubtedly, in the vast majority of cases, the affection of the liver is of that kind known as cirrhosis. Enlargement of the liver from fatty or other deposit, was found in only one of the cases.

The purely fatty liver certainly does not give rise to peritoneal effusion. Having met with a large number of examples of the latter in hospital practice, I am warranted in speaking thus positively on this point. But that an abnormal amount of fatty deposit may coexist with the changes giving rise to peritoneal dropsy is undoubtedly true, although it is an exception to the rule. This was the fact in two of the cases analyzed; and in one of these cases the amount of fatty deposit coexisting with cirrhosis was sufficient to cause considerable enlargement of volume, the weight being 6 lbs. 6 oz. Whatever views may be held respecting the point of departure, or the nature of the changes in cirrhosis, it seems to be clear that the dropsy in fatal cases is due to congestion of the portal system arising from obstruction to the free passage of the portal blood through the liver. Fatty deposit does not involve this obstruction sufficiently to produce dropsy; and this remark holds good with respect to carcinoma of the liver, and of the deposit known as lardaceous, certainly in the majority of cases. It is easy, however, to understand that portal obstruction and consequent congestion, sufficient to produce dropsy, may occur independently of any hepatic lesion. Obstruction of the vena portæ may arise from a coagulum within the vein, or, by outward pressure from a tumour pressing upon the vein, examples of which have been reported. That enlargement of the spleen may give rise to hydro-peritoneum is not probable. In cases of dropsy attributed to this organ, it is fair to presume that coexisting disease of the liver or some other causative condition was overlooked. Disease of the heart is not associated sufficiently often with cirrhosis to assume that any pathological connection exists between the two affections when they are found together: the union is to be regarded only as a coincidence. Disease of the kidney, on the other hand, is associated in fatal cases sufficiently to suggest the probability of some pathological connection, but whether one conduces to the other, and, if so, which stands to the other in the relation of causation, or whether both are in the relation of effects of a common cause, remain to be ascertained. Other affections found in fatal cases, such as meningitis, pleurisy, pulmonary œdema, doubtless occur as coincidences.

It is to be borne in mind that thus far the causation of hydro-peritoneum has been considered with reference to the facts obtained after death. Of course, attention has been limited to fatal cases. The source of the affection in the few cases which end in recovery, will be one of the points of inquiry in proceeding now to consider those facts pertaining to the histories during life which had a bearing on the causation. These facts are to be considered with reference to their causative influence either proximately or remotely, in other words, as concerned immediately in the production of the dropsy, or as conducive to abnormal conditions on which the dropsy is immediately dependent. Directing attention, first, to the most frequent and efficient

of the remote causes, I will interrogate the histories respecting the habits of the patients as regards the use of alcoholic stimulants.

Of 20 fatal cases, in the histories of which the habits of the patients as respects drinking are stated, in 17 intemperance was acknowledged. In only three of these cases was intemperance denied; and in one of these 3 cases the patient admitted the habit of drinking, but not to excess. Of 20 non-fatal cases, in 12 intemperance was acknowledged. In 6 cases intemperance was denied, but in 3 of these 6 cases moderate drinking was admitted. In 2 cases only was it certain that the patients were not in the habit of drinking, in one case the patient being a child twelve years old. Thus, of 40 cases, fatal or non-fatal, intemperance was acknowledged in 29; in 4, moderate drinking was acknowledged, leaving 7 cases in which the use of alcoholic stimulants was not ascertained; and of these 7 cases in 2 only was it certain that alcoholic stimulants were not used to excess. Of the 29 cases in which intemperance was acknowledged, in 24 the form of alcoholic stimulant used was noted, that is, whether spirits, wine, or malt liquors. In all these cases, with a single exception, spirits were used. In the excepted case the patient stated that he drank only beer.

As regards the mode of drinking, of the 23 cases in which spirits were used, in 15 information is noted in the histories. And in all of these 15 cases, the mode of drinking was, to take raw spirits at different periods of the day, before breakfast, and at other times, on the empty stomach, a little water being drank generally after the spirits. In the remaining 8 cases, the histories contain no information on this point. This result is striking, and accords with the view which other clinical observers have entertained, viz., that the habit of drinking spirits undiluted on an empty stomach, leads to the production of cirrhosis of the liver. So far as the facts are recorded with reference to this point in this collection of cases, this was the rule, without a single exception, among the patients addicted to spirit-drinking.

As regards the length of time during which the habit of spirit-drinking had existed, facts are noted in 18 cases. In all, the habit had existed for a long time. In one case the duration was 25 years; two patients stated that they had drank daily from boyhood; in 4 cases the duration was 10 years; in one case 8 years, and in the remaining cases it is simply noted that the habit had existed for several years, or for a long period. In 5 cases it is noted that, for some time prior to the development of hydro-peritoneum (in the one case two, and in the other case three months), the patients had drank comparatively little, having been so situated as not to be able to obtain liquor. This is interesting as going to show that other causes than the continued use of spirits may determine the epoch of the occurrence of dropsy. The kind of spirit drank is noted in 11 cases; and in 9 of these it was whiskey, in one case it was brandy, and in one gin and

brandy were drank. The preponderance of cases in which whiskey was used may be readily explained by the fact that this is the liquor commonly drank by persons in the station to which most of the patients belonged.

The foregoing results prove the agency of the prolonged use of spirits in the causation of hydro-peritoneum. They warrant the conclusion that when the dropsy depends on cirrhosis of the liver, the abuse of alcoholic stimulants is to be inferred. In all the fatal cases in which an autopsy was made, and the existence of cirrhosis thus positively ascertained, intemperance was known to have existed, save in the case of greatly contracted liver with old and firm peritoneal adhesions; in this excepted case the habits of the patient were not noted, but it may be presumed they were good. The diagnosis of hydro-peritoneum dependent on cirrhosis, thus, renders it altogether probable that patients have been addicted to the use of alcoholic stimulants; and, in hospital practice, it is generally safer to rely upon this law of etiology than to trust to the statements of patients when the habit of drinking is denied. This remark is especially applicable to females, whose statements with regard to habits, as experience has taught me, are much less reliable than those of male patients; the explanation, probably, being that the sense of shame in acknowledging vicious habits is greater in females than in males. The frequent occurrence of cirrhosis in drunkards is not new, but according to some writers this affection occurs not infrequently in those who are not intemperate. For example, Dr. Wood, in his work on Practice, says that a large proportion of the patients who have come under his notice have been of temperate habits. This assertion is at variance with the facts which have been presented, and I can only account for it by supposing that Dr. Wood has been deceived by patients with respect to their habits.

The inquiry arises here, How does alcohol act on the liver to produce cirrhosis? The explanation now commonly received is, that the alcohol passing readily into the portal blood, and carried at once to the liver, gives rise to inflammation of a low grade in the interlobular spaces, and that exudation occurs in this situation as a result of inflammatory action. This explanation is supposed to be sustained by the mode of drinking shown to conduce especially to cirrhosis, viz., taking raw spirits on an empty stomach. The explanation is plausible, but it must be considered as hypothetical. The facts are perhaps not less consistent with the hypothesis of cirrhosis being a degeneration taking its point of departure from the cells of the lobules.

What causes may co-operate with the abuse of alcohol in giving rise to hydro-peritoneum, and how is the affection to be accounted for in exceptional cases which end in recovery? There are reasons, derived from the clinical history of the affection, for believing that when the dropsy is dependent on cirrhosis, and the cirrhosis on the habit of spirit-drinking, auxiliary causes are often involved. Were it not so, the prognosis in cases

of dropsy in the intemperate would be even more unfavourable than it is. I may mention as a reason for believing that auxiliary causes are often involved, that, when the dropsical effusion begins, it is apt to increase rapidly, leading in a short time to distension of the abdomen. This would not be expected were the dropsy dependent exclusively on the cirrhosis which has been slowly going on for months or even years. It is not probable that the hepatic lesions undergo any marked increase at the time when dropsy occurs; what then determines the time of its occurrence, and why should it be developed to so great a degree in so short a period as is frequently observed? Another reason which may be mentioned is, the frequent occurrence of œdema of the lower extremities prior to the development of dropsy of the peritoneum. It will be seen when we come to consider the clinical history of the affection, that such is the fact. And this fact points to the existence of other causes of dropsy than the hepatic lesions. Finally, the occurrence of cases of hydro-peritoneum ending in recovery, cases which, although rare, do occur, is proof that the affection may arise independently of cirrhosis or any other irremediable structural lesions. I shall proceed to interrogate the histories with reference to any circumstances showing causative influences aside from the effects of alcoholic stimulants. I shall reserve the pre-existence of cardiac and renal disease for subsequent inquiry.

In 22 cases the histories show affections immediately antecedent to the dropsy, which may fairly be supposed to have operated as auxiliary causes. The facts in these cases are as follows: In 10 cases the dropsy followed intermittent fever, the patients having been subject to relapses of this disease for a greater or less period. In several of these cases the relapse immediately preceding had not been arrested, and the patients had suffered from the disease for several weeks. In 2 of these cases the dropsy was developed after the patients had been admitted into hospital. In one case the patient had, in addition, chronic ulcers of the leg dependent on syphilis, and in one case an attack of epidemic cholera had preceded the intermittent fever. In 3 cases the dropsy was preceded by hæmatemesis, the quantity of blood vomited being considerable. In 2 cases the patients were females, and had been confined shortly before the development of the dropsy. One of these cases ended in recovery, and in this case it was certain that the patient was not addicted to the use of alcoholic stimulants. Diarrhœa preceded the dropsy for several weeks in 2 cases. In one case the patient was admitted for dysentery, and the dropsy was developed after his admission. In one case the patient was admitted with pneumonia, and the dropsy was developed during convalescence from that disease. The patient also had chronic ulcers of the leg. In one case the dropsy was developed during convalescence from rheumatism; and in one case during convalescence from a fever of a month's duration, supposed to be typhoid fever. In one case the patient was admitted for a syphilitic eruption, and

was nearly ready to be discharged from the hospital when the dropsy made its appearance.

I think it is very probable that among the other cases than the 22 just referred to, antecedent affections, or circumstances may have existed in some, to which the dropsy was measurably attributable, for many of these the histories are defective as regards the events or condition of the patients prior to the development of the dropsy. But, making no account of this supposition, in nearly one-half of this collection of cases it may be assumed that the dropsy was proved by morbid conditions associated either with cirrhosis of the liver, or with whatever may have been the affection on which the dropsy was immediately dependent.

The antecedent affections were remotely concerned in the causation of the dropsy, acting, as may be supposed, by deteriorating the blood, weakening the circulation, or lowering the vigour of the body. Had these associated morbid conditions not existed, the occurrence of the dropsy might have been, to say the least, postponed. This is an important consideration in connection with the treatment, and the course of the disease in certain cases will be found to sustain the view just presented. It is worthy of note that in 5 cases patients were received into hospital for antecedent affections, the dropsy being developed after admission. It is to be added that the 22 cases are divided equally among those which were fatal and those which were non-fatal, *i. e.*, eleven in each division.

In the foregoing interrogation with respect to affections, etc., antecedent to the dropsy, I did not embrace cardiac and renal disease. In the cases in which disease of the heart or kidneys coexisted with the dropsy, it is fair to infer that the former preceded the latter; and it is also to be inferred that, in some of the cases, at least, the disease of the heart and kidneys contributed to the development of the dropsy. Directing attention, first, to the coexistence of disease of the heart, it has been seen that, of ten of the fatal cases in which post-mortem examinations were made (the condition of the heart being noted in only these ten cases), this organ was the seat of disease in but three cases. In one of these three cases pericardial adhesions, existing without enlargement, were probably innocuous; in the other two cases, the heart being enlarged, some influence in the production of the dropsy may be suspected. Of the cases, fatal and non-fatal, exclusive of those in which autopsies were made, the existence, or otherwise, of cardiac disease as determined by means of physical exploration, was noted in twenty-two. Of these 22 cases in 15 there were no physical signs of disease of the heart. Of the remaining 7 cases, in 4 a systolic murmur existed at the base, and the organ was not enlarged. Eliminating these 4 cases as cases in which the existence of organic lesions was doubtful, and in which the lesions were innocuous, if they existed, since there was no enlargement, there remain 3 cases. In these 3 cases there were mitral lesions and enlargement of the heart, and, hence, some influence in the production of the

dropsy may be suspected.[1] Thus, of 32 cases in which the condition of the heart was noted, as determined either by autopsical examination or by physical signs, in 5 cases only were there lesions involving enlargement of this organ. Here we have again exemplified the fact that disease of the heart is not associated sufficiently often with the morbid condition on which hydro-peritoneum is immediately dependent (in cirrhosis of the liver in the vast proportion of cases), to show the existence of any pathological connection between the two. When the two are associated, however, it is not improbable that the disease of the heart may act as an auxiliary cause in the development of the peritoneal dropsy.[2]

As regards coexisting disease of the kidneys, it will be recollected that of 11 autopsies in which the condition of these organs is noted, they were considered to be diseased in six. Hence it was surmised that there might have been in these cases some pathological connection between disease of the kidneys and cirrhosis of the liver, consisting either in a dependence of one upon the other to a greater or less extent, or in both being effects of the same causes. It was stated that the question of a pathological connection would again come up in connection with the cases in which autopsies are not embraced in the histories, inasmuch as the presence of albumen in the urine may be considered as evidence of disease of the kidneys, and *vice versa*. An interrogation of the cases with reference to albuminuria leads to the following results: in 18 cases (six fatal cases in which autopsies were not made and twelve non-fatal cases), the histories contain information on this point, and in not one of these cases was the urine found to be albuminuous. In most of the other cases the urine was undoubtedly tested for albumen, and, had it existed, the fact would have been noted, so that the absence of albuminuria may be inferred in these cases. Of the 11 fatal cases in which autopsies were made, the kidneys, as just stated, were considered as diseased in 6. Of these 6 cases, the histories state that albumen was not found in 3; in 1 case the urine was slightly albuminous, and in 1 case the condition of the urine was not noted. Of the 5 cases in which autopsical examination revealed no disease of the kidneys, in all albumen was not present in the urine.

These facts are interesting in connection with the results of the examinations after death as regards disease of the kidneys. Taking albuminuria as

[1] In two of these 3 cases the ages were respectively 12 and 13 years.

[2] It is perhaps generally supposed that cirrhosis and disease of the heart are frequently associated. M. Becquerel, in his essay on cirrhosis (*Archives Générales*, 1840), stated that of 42 cases disease of the heart coexisted in 21. But of these 21 cases in 13 the cirrhosis was considered to be in the first degree, giving rise to trifling symptoms or none whatever. Dr. Budd (on diseases of the liver), says "it is perhaps fair to infer that, in some of these cases, M. Becquerel mistook for the first stage of cirrhosis the nutmeg appearance of the liver produced by partial congestion of the capillaries."

a diagnostic criterion of disease of the kidneys, the latter very rarely coexists with hydro-peritoneum, or with the affection existing in the great majority of cases, viz. cirrhosis of the liver. The results of autopsical examinations and of examinations of the urine for albumen are not in accordance, the former going to show a large, and the latter a very small proportion of cases in which disease of the kidneys coexists. And of the 6 cases in which the kidneys were found to be diseased after death, in 3 the urine is noted to be not albuminous. It would seem, from these facts, as if disease of the kidneys is apt to coexist with hydro-peritoneum without being manifested by albumen in the urine.

On what pathological conditions is hydro-peritoneum dependent when it ends in recovery? Cirrhosis of the liver being an incurable lesion, when the dropsy is dependent thereon, recovery is hardly to be expected. It will be seen hereafter that, although this lesion in all probability exists, an apparent recovery sometimes takes place; that is, the dropsical effusion may be removed, and a reaccumulation not occur for a greater or less period. But the dropsy sometimes occurs under circumstances which render it probable that cirrhosis does not exist, and the recovery may be complete and permanent. I have met with a striking instance of this kind. The following are the important facts contained in the history:—

Mrs. W., aged about 24, had had two children, the youngest being 5 or 6 months old, which she was nursing. The patient came under my observation in March, 1861. She was under the care of Dr. Dudley, of Brooklyn. Enlargement of the abdomen had been first observed shortly before I saw her. The enlargement was evidently due to liquid in the peritoneal sac. The amount of liquid was sufficient to cause considerable enlargement, but not to render the abdominal walls tense. She complained of slight pain over the false ribs on both sides. The abdomen was not tender on pressure. The spleen appeared to be moderately enlarged; the liver seemed to be neither enlarged nor contracted. She had febrile paroxysms occurring irregularly, ushered in by chilly sensations and followed by sweating. These speedily ceased under the use of quinia in full doses. There was no œdema of face or limbs. The urine was not albuminous. She was moderately anæmic. There were no symptoms or signs of pulmonary or cardiac disease.

When the febrile paroxysms just mentioned were arrested, the dropsy diminished, but, in a short time, the accumulation of liquid was greater than before. Elaterium, given to produce free hydragogue operations, caused the dropsy temporarily to disappear, but the patient was greatly weakened by this remedy. She was treated with the iodide of potassium, and the citrate of iron and quinia, with generous diet. Under this treatment the affection remained stationary up to the latter part of June. She was then advised to begin to go out of doors, which, owing to general weakness, she did at first with considerable difficulty. From this time she

began to improve. Shortly afterward she went into the country and all remedies were discontinued. She continued to improve; and during the summer the dropsy entirely disappeared and she regained perfect health, which she has preserved up to this time. The patient was also seen in consultation by Prof. Willard Parker.

This case shows that hydro-peritoneum may occur, persist for several months, then disappear, and complete recovery ensue. The position and character of this patient rendered it certain that the usual source of cirrhosis, viz., use of alcoholic stimulants, was not involved in the causation. The supposition of subacute peritonitis is hardly admissible, in view of the absence of the local symptoms of inflammation and of pulmonary tuberculosis, together with the abundance of the liquid effusion. I confess an inability to offer any explanation in this or other similar instances; I cite the case chiefly in illustration of the fact that the affection may depend on causative conditions which are temporary and lead to no serious results. This fact is important to be considered in connection with the prognosis in certain cases; but, unhappily, examples like the one just cited are exceedingly rare. Doubtless the anæmia and general debility incident to lactation contributed to the development of the dropsy in the case just cited, but there must have existed, in addition, some pathological condition determining the seat of the affection.

It remains to consider the influence of age, sex, and civil condition on the causation. The age is stated in 43 of the cases. The greatest age is 69 years, one patient only being as old as this. The next highest is 60, the next 53, two patients being as old as the latter age. With the exception of one patient, who was 51, all the remainder were 50 or under. In 8 cases the ages were between 40 and 50; in 13 cases between 30 and 40; in 10 between 20 and 30; in one case the age was 12, and in another case the age was 13 years. In the two cases last enumerated, there existed mitral lesions with enlargement of the heart. Hydro-peritoneum, thus, occurs in the great majority of cases over 20 and under 50 years of age, the larger proportion of cases being between 30 and 40 years. These results are consistent with the fact that in most cases the affection is due to the more or less prolonged use of alcoholic stimulants. Habits of intemperance, if formed prior to 20 years of age, have not been sufficiently prolonged to produce cirrhosis, and it is rare for persons to become intemperate after the age of 50.

As regards sex, of 45 cases, 36 were males and 9 females. The large preponderance of the former is doubtless owing to the proportionately greater prevalence of intemperance among males than among females.

In the occupations of the patients nothing appears to show any special influence derived from this source. Sixteen were labourers, three were carpenters, two were brewers, and, among the remainder, the following occupations had each a single representative: storekeeper, carver, butcher, clerk,

tailor, and tinsmith. In the great majority of the cases having been observed in hospital practice, very few were from the higher walks in life. But that the great majority of cases were observed in hospitals, is owing to the comparative infrequency of the affection among the better class of patients in private practice. This is, doubtless, owing to the dependence of cirrhosis on spirit-drinking, and in a measure, at least, on a mode of spirit-drinking which is much more in vogue among the labouring than among the intemperate portion of the so-called better classes of society. The questions might be raised whether spirituous liquors of a bad quality may not especially lead to cirrhosis, and whether the use of such liquors may not be a reason for the prevalence of the affection among the labouring classes. In other words, is cirrhosis purely an effect of alcohol, or does it proceed, to a greater or less extent, from other principles contained in spirituous liquors? I must content myself with raising these questions. I am not prepared to answer them. I have heard it said by medical men in Kentucky that the pure form of whiskey made in that State never causes cirrhosis, but I cannot vouch for the correctness of this statement.

Leaving, now, the consideration of the causation of hydro-peritoneum, the conclusions drawn from the results of the analysis of the cases in this collection may be summed up as follows:—

The immediate causative condition in fatal cases pertains to the liver. This organ, as a rule, is contracted and diminished in weight; the surface may be either smooth or nodulated (hob-nailed), and it is sometimes notably deformed. Contraction and deformity may be associated with extensive peritoneal adhesions; the changes in size and form being, then, in a measure at least, attributable to external pressure.

The condition of the liver, giving rise to hydro-peritoneum, except in cases in which it proceeds from external pressure, is generally a result of the prolonged abuse of alcoholic stimulants; and this result follows the habitual drinking of spirits, especially when taken raw, or but little diluted, upon an empty stomach.

Although the spleen is enlarged in a certain proportion of cases, in connection with the altered condition of the liver generally known as cirrhosis, there is no ground for supposing that the splenic enlargement is a cause of the dropsy. It may be doubted whether enlargement of the spleen alone ever gives rise to hydro-peritoneum.

Disease of the heart is found too rarely associated with cirrhosis of the liver to infer any relation of cause and effect between the two affections. When the two are associated it is probably a mere coincidence. Coexisting disease of the heart, however, may contribute to the dropsy as an auxiliary cause. Existing independently of disease of the liver, disease of the heart gives rise to hydro-peritoneum only as an element of general dropsy.

Disease of the kidneys is associated with cirrhosis oftener than disease of the heart; but whether any relation of cause and effect exists between

the two affections, or whether both proceed from the same remote cause or causes, is to be determined by the analysis of a larger collection of cases. Coexisting disease of the kidneys may contribute indirectly to hydro-peritoneum by inducing hydræmia and impairing the vital forces. Existing independently of disease of the liver, disease of the kidneys gives rise to hydro-peritoneum only as an element of general dropsy.

Various affections, coexisting with cirrhosis of the liver, such as intermittent fever, hæmatemesis, diarrhœa, may determine the epoch when hydro-peritoneum becomes developed, or tend to increase the dropsical effusion. The dropsy may follow convalescence from some disease, such as dysentery, typhoid fever, and pneumonia. It may occur during lactation, or shortly after confinement. The dropsy, under these circumstances, is determined or promoted in consequence of the effects on the blood and vital forces.

Hydro-peritoneum occurs, although very rarely, when not dependent on cirrhosis of the liver, or any other incurable lesions, cases ending in recovery. The morbid condition or conditions on which the dropsy is immediately dependent in these cases must be left unexplained.

Hydro-peritoneum occurs much oftener among males than females. The larger proportion of patients are between 30 and 40 years of age; it occurs very rarely under 20 or over 60 years. Its causation is not specially favoured by any particular occupation.

SYMPTOMATOLOGY OF HYDRO-PERITONEUM.—Of the important symptoms which make up the clinical history of hydro-peritoneum, the first claiming notice are those which relate to the abdomen and digestive system. After having considered these, the symptoms referable to other anatomical systems, viz., tegumentary, circulatory, urinary, and nervous,[1] will respectively claim attention.

Symptoms referable to the abdomen and digestive system.—Abdominal pain rarely precedes or accompanies the dropsical effusion. In four cases only have I noted the existence of pain; situated, in two cases, in the right hypochondrium, and in the other cases more diffused. In most of the histories nothing is stated respecting this symptom; but in several the absence of pain is noted. Transient colic pain would not be deemed of sufficient importance to record; but this is not of frequent occurrence. In one case a sense of soreness in the abdomen preceded the dropsy. In none of the other cases is it stated that soreness, or tenderness on pressure existed.

[1] With respect to the consideration of symptoms, I wish to repeat, that several of the histories are incomplete, the cases having been only for a time under observation, and the records sometimes not embracing all details even when the cases were observed during the whole progress of the affection. The enumerations are to be considered as only approximations to accuracy as regards the frequency with which the different symptoms occur. In view of the fact just stated, I shall devote but a little space to the symptomatology.

Patients sometimes shrink when deep, strong pressure is made with a view to determine whether the spleen or liver be enlarged; but, as a rule, no more tenderness or soreness exists than is attributable to the tension of the abdominal walls from the pressure of the liquid. The absence of pain, soreness, and tenderness, is one of the points in the differential diagnosis of hydro-peritoneum and peritonitis with effusion. Another point is the absence of tension of the abdominal walls from tonic rigidity of the muscles. In hydro-peritoneum the walls are tense only as a result of distension from the amount of effused liquid. I may mention here that pain in the right shoulder is noted in two cases.

The enlargement of the abdomen from the accumulation of liquid, was either great or considerable in most of the cases. In four cases only was the quantity of liquid moderate. It may be laid down as a rule that, when hydro-peritoneum occurs, the dropsical effusion almost invariably increases so as to produce notable distension, and in the large proportion of cases the abdominal walls become more or less tense. Another interesting fact with regard to the effusion is, the rapidity with which it takes place. In the majority of cases, when the dropsy once commences, it goes on rapidly, and in a short time the abdomen becomes considerably or greatly enlarged. In the abstracts of fifteen of the histories made for this analysis, the rapid accumulation of liquid is stated; that is, considerable or great enlargement taking place within a period varying from two months to a few days. In one case the effusion increased from a moderate to a large amount in the course of a few hours, occasioning sudden dyspnœa to such an extent as to require immediate tapping; and this occurred a second time in the same case. I have already alluded to the frequency with which the dropsical effusion becomes rapidly large in amount, as a fact going to show the co-operation of other circumstances than the hepatic obstruction due to the structural lesions in cirrhosis, in the causation of the dropsy. These lesions are doubtless slowly produced, and it is not probable that they undergo a sudden and rapid development at the time when the dropsy occurs and is rapidly increasing. Is it not probable that, after a certain amount of effusion has taken place, the pressure of the liquid upon the liver, by adding to the obstruction to the portal circulation in this viscus, increases the effusion? This question will again come up in connection with the non-occurrence of effusion, in certain cases, for a greater or less period after the liquid has been removed by tapping.

It has been seen that in all the fatal cases but one in which examinations after death were made, the liver was more or less diminished in volume. In the histories of the remainder of the cases, fatal or non-fatal, enlargement of the liver is noted in two cases. In these cases the lower margin extended 2½ or 3 inches below the false ribs, as ascertained by manual examination through the abdominal walls. Enlargement of the liver, if the abdomen be not greatly distended, may generally be ascertained by palpa-

tion, and had it existed in other cases the fact would doubtless have been noted. Contraction of the liver, on the other hand, cannot be so well determined by manual examination. Is it not determinable by percussion? With regard to the answer to this question, I believe the general impression to be incorrect. The space between the pulmonary resonance above and tympanitic resonance from the transverse colon below, is supposed to represent the vertical diameter of the liver. That this is not so, is easily demonstrated in certain cases in which enlargement of the liver is perceptible by the touch. I have been accustomed to point out at the bedside a discrepancy, sometimes of several inches, between the positive evidence afforded by palpation of the situation of the lower margin of the liver, and the apparent evidence afforded by percussion. The tympanitic resonance from the colon may be propagated for a considerable space above the lower margin of the liver, and without any appreciable diminution of intensity. This resonance is not reliable as evidence of the situation of the lower margins of the liver. The distance between the pulmonary and tympanitic resonance is only an approximation to the vertical diameter of the organ. Not infrequently when the liver is contracted, the pulmonary and tympanitic resonance almost and even quite meet. I have for some time ceased to consider as accurate the measurement of the liver by means of percussion.

The same remarks will apply measurably to the spleen. The evidence afforded by tympanitic resonance of the lower and anterior borders of this organ is unreliable for the same reason, viz., the organ transmits readily tympanitic resonance. The upper border of the organ as well as that of the liver, is indicated by the pulmonary resonance, which is not, like the tympanitic, propagated more or less beyond the border. Enlargement of the spleen, if considerable, can generally be felt. Exclusive of the cases in which examinations were made after death (to which reference has already been made), this organ is noted as enlarged in only one case. Directly after tapping, when the abdominal walls are greatly relaxed, explorations for the liver and spleen may be made with most facility. At this time, the liver may be felt to be abnormally hard and nodulated even when contracted, by the fingers pressed up and under the false ribs.

Hæmatemesis is noted in six cases. But in three of these cases it preceded the development of the dropsy, and did not recur afterward. In two cases it occurred repeatedly. Both of the latter cases were fatal; indeed, in all these cases, save two, a fatal result has taken place; while the cases under my observation and the two excepted cases have recently come under observation, and will probably end fatally ere long. In two of the cases melæna also occurred, and in two cases melæna occurred without hæmatemesis. Vomiting (exclusive of hæmatemesis) is noted in only two cases, and in both of these it was a prominent symptom. Diarrhœa is noted as a symptom, more or less prominent, in eight cases. On the other hand,

constipation is noted in several cases; but in the larger number of cases neither of these symptoms was present. Diarrhœa can hardly be regarded as a favourable symptom in cases of hydro-peritoneum; in most of the cases in which it occurred, the progress of the affection was unfavourable. It might be deemed *à priori* a desirable event, so far as the dropsy is concerned, the congested portal vessels being relieved, in a measure, by transudation through the intestinal mucous membrane; the mode of relief, in fact, being the same as when hydragogue cathartics are given. Clinical observation, however, shows not only that diarrhœa occurs oftener in cases which progress unfavourably than in those which pursue a favourable course; but that measures which succeed in relieving the diarrhœa appear, sometimes at least, to exert a favourable effect on the dropsy. In one of the cases it is noted that the dropsy diminished notably after a troublesome diarrhœa had been relieved at one time by bismuth, and subsequently by opium.

Loss of appetite and disinclination for food existed in many of the cases while the patients were under observation, and especially when the disease was progressing toward a fatal termination. Some patients retained a tolerable and some a good appetite. Generally, when the dropsy was sufficient to distend the abdomen, patients complained of a sense of fulness after taking food. In several instances this was a source of complaint when the abdomen was distended, and, after the liquid was removed by tapping, the patients were able to eat freely without inconvenience. In the history of one case it is noted that the gums were spongy, and hemorrhage occurred in this situation as in scorbutus. The superficial veins of the abdomen in most of the cases were more or less enlarged. The cases differed in this regard, but, from a survey of the histories, nothing appears to invest this symptom with much importance.

Symptoms referable to the integument.—Under this head I shall embrace *œdema*. And, as regards this symptom, the facts developed by an analysis of these cases conflict with certain commonly received opinions. More or less œdema of the lower limbs, as is well known, coexists often with hydro-peritoneum. But it is supposed to follow the latter, and to be proportionate to the amount of abdominal distension. In a large proportion of these cases œdema of the lower limbs preceded the enlargement of the abdomen. Of twenty-one cases, the histories of which contain distinct information on this point, in eleven œdema of the lower limbs had precedence. It has been stated (*vide* treatise by Dr. Budd) that when œdema of the lower limbs precedes the peritoneal dropsy, the existence of cardiac or renal disease is to be inferred. The facts developed by this analysis are opposed to this opinion. Of the eleven cases in which œdema of the lower limbs preceded the hydro-peritoneum, five were fatal and six non-fatal. In not one of the six non-fatal cases was the urine albuminous, or were there present physical signs of disease of the heart. Autopsies were made in all

of the five fatal cases. In three of these the heart and kidneys were found to be healthy; in one case old pericardial adhesions existed, and the weight of the heart was 14 oz.; in the other case there was granular degeneration of the kidneys. In the latter case, œdema of the face existed together with œdema of the lower limbs; but in all the other cases, fatal and non-fatal, the œdema was confined to the lower limbs. It follows, from these facts, that in about one-half the cases in which hydro-peritoneum and œdema of the lower limbs coexist, the latter precedes the former; and that, when this is found to be so, it is not to be inferred that the dropsy is associated with renal or cardiac disease. How is this precedence of œdema to be explained? The explanation which seems to me probable is, that, in addition to the immediate cause of the peritoneal dropsy (generally cirrhosis of the liver), other causes favouring dropsical effusion exist in these cases—causes which impair the condition of the blood, or weaken the forces carrying on the circulation. I have had occasion already to offer this explanation in endeavouring to account for the occurrence of peritoneal dropsy at a particular epoch, and for the rapid increase of the dropsy after it commences. It is possible that a small amount of abdominal effusion, not enough to produce any marked enlargement of the abdomen, may involve pressure on the iliac veins to obstruct the return of blood from the lower limbs sufficiently to give rise to the œdema. It is doubtless chiefly in consequence of this pressure and obstruction that œdema of the lower limbs is produced in the cases in which it occurs subsequently to the abdominal distension. It is worthy of note, that in one of the cases in which œdema of the lower limbs preceded the hydro-peritoneum, it disappeared after the latter had become developed.

Œdema of the face, upper extremities and chest, in other words, anasarca, does not belong to the clinical history of simple hydro-peritoneum. Of thirty-nine cases, in the histories of which information on this point is contained, anasarca existed in only four; and in each of these four cases save one, the œdema of the upper part of the body was slight. In each of these cases either cardiac or renal disease existed, to wit, in the disease of the kidneys alone, in one mitral lesion and enlargement of the heart alone, and in one old pericardial adhesion, together with disease of the kidneys. In some of the cases in which the œdema was limited to the lower part of the body, the swelling of the limbs was very great, extending also sometimes to the genital organs. The appearance of the patient in these cases presented a remarkable disproportion between the lower limbs with the abdomen and the upper part of the body—the latter greatly emaciated, and the former enormously enlarged. But in these cases the heart and kidneys are usually free from disease. The existence, however, of œdema in the upper part of the body, *i. e.*, in the face, upper limbs, or over the sternum, is evidence of coexisting disease of the heart or the kidneys, or of both these organs.

Hydro-peritoneum, even when the abdominal distension is great, is not always accompanied by œdema. In nine cases œdema did not exist while the cases were under my observation; and in some of these cases the abdomen was greatly enlarged by the amount of dropsical effusion.

Cholæmia or icterus may be included under this head. This symptom is rarely present in cases of hydro-peritoneum. Of the 46 cases it is noted in the histories of 7; and in one of these cases it preceded, but did not accompany, the dropsy. It is not a symptom of favourable omen. Of the 7 cases, 6 ended fatally under my observation. In none of the cases was the yellowness of the conjunctiva and skin intense, but it was slight in all, and in the non-fatal cases it was extremely slight. The rare occurrence of jaundice in cases of hydro-peritoneum dependent on cirrhosis, is one of the facts going to show that the bile pigment is a product of the secretion of the liver, not preformed in the blood, and that the yellowness of the tissues denotes the resorption of bile. In certain of the cases of cirrhosis in which the liver is greatly contracted and deformed, the secretory function of the organ must be impaired to a considerable extent; and jaundice would be expected to occur frequently, instead of very rarely, if this symptom depended on the accumulation in the blood of bile pigment in consequence of its non-secretion by the liver.

Pallor of the prolabia and skin, denoting anæmia, existed more or less in the great majority of the cases. Some of the cases were characterized by a marked anæmic aspect. In general, this aspect was marked in proportion as other symptoms showed the condition of the patient to be unfavourable as regards recovery or improvement. This symptom, associated with other symptoms which have been considered, gives rise to appearances which are diagnostic and striking, viz., pallor of the countenance, emaciation of the face and upper extremities, distension of the abdomen, with enlarged superficial veins, and œdema of the lower extremities. When this group of appearances is presented, a glance suffices to determine the disease, and the hopeless condition of the patient.

Symptoms referable to the circulation.—The coexistence of disease of the heart has been already considered. I have only to notice, under this head, the condition of the circulation as represented by the pulse. The state of the pulse is noted in 25 cases. But as the histories consist of notes made at irregular intervals, and in many of the cases do not embrace the whole duration of the disease, I have not data for determining the variations as regards this symptom, at different periods in the same case. The facts which were noted show the absence of febrile movement in cases of hydro-peritoneum, except there be some superadded or intercurrent affection. In some cases the pulse was not accelerated; in other cases it was more or less frequent. It was generally small, soft, and feeble. When frequent, the frequency was of that kind which denotes diminution of the vital forces or asthenia. A notably small, frequent, and feeble pulse in

this affection may be considered as evidence that the case is advancing toward a fatal termination.

Symptoms referable to the urinary system.—My records contain very little respecting the urine beyond the presence or absence of albumen. As regards albuminuria, the facts have been already stated. It is noted frequently that the quantity of urine was small; but in several cases it was abundant. A large increase, occurring always after tapping, is noted in one case in which the abdomen was punctured thirty times. In one case the urine was habitually of a bright vermilion colour as if it contained blood. The microscope, however, showed absence of the red globules, and no albumen was present. The urates were very abundant in this case, the deposit being of the same colour as the liquid. The appearances corresponded with those described by Golding Bird as belonging to purpurine. Without a microscopical examination, the colour might be considered as denoting hæmaturia. Had a similar condition of the urine existed in any of the other cases while they were under my observation, it could hardly have failed to attract attention, and would have been noted.

Symptoms referable to the nervous system.—In the great majority of cases no important phenomena pertaining to the nervous system are noted. The mode of dying is usually by slow asthenia; if, however, the accumulation of liquid be very great, or if it take place very rapidly, death may be due to the extent to which the respiratory function is compromised. The mental functions are generally preserved up to the last moments of life. To the latter rule there are occasional exceptions. In three cases I have noted the occurrence of delirium several days before death. In one case the delirium was hilarious; in one case the patient appeared bewildered, and in one case the patient lapsed from childishness into imbecility. These cases ended in coma. In three other cases the patients died comatose. In one case convulsions occurred followed by coma.

These few facts are all which I have noted. It is certain that notable disturbance of the nervous system does not occur until the affection approaches a fatal termination. What is the rationale of the delirium, coma, and convulsions which are sometimes observed? This is an interesting inquiry. My facts do not enable me to answer it. These phenomena may arise from the retention of the blood of the excretory principles contained in the bile. Cholesterine is doubtless one of these excretory principles; and perhaps there are others not yet observed. Here is a rich field for clinical research. The distinctive features of cholesteræmia have not as yet been ascertained. I have been led to suspect that this kind of blood-poisoning occurs especially in certain cases of fatty liver. But the coexistence of disease of the kidney may explain the occurrence of the nervous phenomena just mentioned. It is a question to be settled by an accumulation of facts whether these phenomena are due to uræmia, or

to the non-elimination of biliary principles, or to both these pathological conditions.

MANAGEMENT OF HYDRO-PERITONEUM.—In the management of hydro-peritoneum a prime object is to effect the removal or diminution of the peritoneal effusion. This object is important in proportion to the distress and danger arising from the amount of effusion. It is desirable, however, when the amount is not great enough to occasion distress or danger. There is no foundation for the idea that the pressure of a certain quantity of liquid tends to restrain further effusion; on the contrary, clinical observation shows rather a tendency of the pressure of liquid to accelerate the progress of the dropsy. Whether the quantity be large or moderate, therefore, its removal or diminution is a therapeutic indication. The means for effecting the object are either direct or indirect. It is effected directly by tapping, and it may be effected indirectly by measures which increase the density of the blood by lessening the proportion of water, and thereby favouring the endosmosis or absorption of the dropsical effusion. The measures for this purpose are diuretic remedies and hydragogue cathartics. These will claim separate consideration.

Diuretic Remedies.—In 13 of my cases diuretics were employed to a greater or less extent. In 8 of these 13 cases no effect upon the dropsy was produced, the amount of liquid either remaining stationary or increasing. The quantity of urine was much increased in 2 cases, the quantity in the other cases being either slightly increased or unaffected. Five of these 8 cases ended fatally under my observation. In 5 of the 13 cases, improvement, as regards the dropsical effusion, took place under the use of diuretics. In 2 of these 5 cases the dropsy diminished under the use of diuretics given for a short period, but the diminution was not less after the diuretics were discontinued, and a tonic remedy substituted. In two cases the diuretics constituted the whole treatment, and the improvement was progressive and marked. In one case after tapping the patient took a solution of the bi-tartrate and the nitrate of potassa, with digitalis, for ten weeks, and during this period there was no return of the dropsy. In this case a purge of calomel and jalap was given weekly, and the diet consisted mainly of toast and cider. This plan of treatment was recommended by some one not connected with the hospital, and adopted by the patient with my consent. At the end of ten weeks the dropsy reappeared, and the case ended fatally. It is to be added that during the ten weeks of exemption from dropsy, the quantity of urine was small.

The diuretic remedies used were as follows: nitrate of potassa alone in 3 cases; do. with bi-tartrate of potassa in 1 case; squill, juniper and the nitrate of potassa in 1 case; nitrate and bi-tartrate of potassa and digitalis in 1 case; bi-tartrate of potassa in 2 cases; acetate of potassa in 1 case; digitalis and squill in 1 case; bi-tartrate of potassa, squill, digitalis and

blue mass in 1 case; bi-tartrate of potassa and digitalis in 1 case; and in 1 case the diuretic remedy is not noted. In the 5 cases in which improvement took place under the use of diuretics, the remedies were as follows: nitrate of potassa in 2 cases; nitrate and bi-tartrate of potassa with digitalis in 1 case; bi-tartrate of potassa with squill, digitalis and blue mass in 1 case, and the acetate of potassa in 1 case. Squill, iodine and digitalis were used by means of external application in 2 cases, but with little or no effect.

These facts by no means afford much evidence of the efficacy of diuretics in the management of hydro-peritoneum; they render it probable, however, that, while in the majority of cases no benefit is derived from these remedies, in some cases they contribute to the object under consideration. This conclusion I suppose to be in accordance with the views generally held by physicians. The difficulty of exciting the action of the kidneys in this affection is, in part at least, explicable. Obstruction to the passage of the portal blood into the general circulation (which occasions the dropsy), prevents the free transportation of the remedies to the kidneys. Moreover, the pressure of the effused liquid on the vessels connected with the kidneys, and also on the kidneys, lessens their functional activity. As proof of this, the quantity of urine is observed to increase notably in some cases immediately after tapping.

With respect to the employment of diuretics, an important consideration is, they may be tried with entire safety, if properly prescribed and not continued too long, since they do not cause much perturbation nor exhaust the vital powers.

Hydragogue Cathartics.—Hydragogues, in doses sufficient to produce abundant liquid dejections, entered into the treatment in seventeen cases. Elaterium is noted as the remedy employed in all save two cases, in which the articles used are not stated. It was probably employed in the latter cases also. Seven of these cases are among the fatal, and an equal number among the non-fatal, cases. In nine of the seventeen cases no appreciable benefit was derived from this treatment. In the remaining eight cases the results were as follows:—

CASE 1.—The dropsical effusion was diminished, but otherwise no improvement. This case ended fatally.

CASE 2.—Diminution of dropsy, but otherwise no benefit. A fatal case.

CASE 3.—Dropsy diminished, but subsequently diuretics were substituted, and general improvement under the use of the latter.

CASE 4.—Diminution of dropsy; subsequently convulsions and sudden death.

CASE 5.—Diminution of dropsy; subsequently diuretics, and removal of the effusion.

CASE 6.—Diminution of dropsy, and temporary general improvement; subsequently elaterium was repeated without benefit.

CASE 7.—Immediate and almost complete removal of the dropsy, but it

shortly returned, and the remedy occasioned so much exhaustion that it was not repeated. Subsequently this patient completely recovered.

CASE 8.—Marked diminution of the dropsy, but it returned and increased when the hydragogues were discontinued.

These results contain very little evidence in behalf of the usefulness of hydragogue cathartics in hydro-peritoneum. The dropsy, in some cases, is diminished by their use, and in a small proportion of cases the diminution is marked. But, generally, little is accomplished, and that little only for a brief period. Owing to the disturbance and prostration caused by their prolonged use, they cannot be continued long enough to effect the object, even when we might hope that, if borne, they might prove effectual. In the majority of cases, if continued, or often repeated, they do harm, rather than good. In short, I believe that, as a rule, they should not enter largely into the treatment.

As one of the indirect means of effecting the removal or diminution of the dropsical effusion, restriction of the amount of ingested liquids is to be mentioned. This is important in conjunction with other indirect means, or with the direct method of treatment. The addition of water to the blood is to be limited as far as practicable, and, for this end, patients should be enjoined to take no more drink of any kind than is consistent with a due regard to the parts of the economy. This part of the management is often imperfectly carried out, because many patients lack the necessary determination and perseverance to conform to our injunctions.

Tapping.—In twenty of the forty-six cases tapping was resorted to. Of these twenty cases, eight are among those which proved fatal under my observation. The operation was performed but once in eleven cases; thrice in four cases; four times in one case; six times in one case; repeatedly (the number of times not stated) in two cases, and thirty times in one case. As the propriety of the operation is a point of much practical importance, I shall present briefly the facts bearing upon its influence on the affection in all of the twenty cases.

In five of the cases the patients were tapped within a few weeks or days of the date of death. The operation in all these cases, save one,[1] was performed for the sake of immediate relief, without any expectation of permanent benefit. Immediate relief followed in all the cases. There is no reason to think that life was shortened in any of the cases; but, on the contrary, it was, probably, in some at least, prolonged by the operation. Fatal prostration or sinking did not occur in any instance. In the remainder of the fatal cases the facts were as follows:—

CASE 1.—The patient was tapped six times in the course of two months,

[1] In the excepted case there was no return of the dropsy at the end of three weeks, and the patient seemed quite well. Death occurred in this case instantly while the patient was conversing cheerfully, and the cause of the sudden death was not ascertained.

and was then removed by his friends from the hospital in order to escape a *post-mortem* examination. He died shortly after leaving the hospital.

CASE 2.—Tapping was performed twice in three weeks. After the second tapping there was no returu of the dropsy for ten weeks, and the patient improved greatly iu appearance and strength. During this ten weeks the patient took daily small doses of the nitrate and bi-tartrate of potassa. He was purged once a week with calomel and jalap, and his diet was toast and cider. At the end of the ten weeks the dropsy returned, and he died shortly afterward. The autopsy in this case revealed a contracted hob-nailed liver.

CASE 3.—The tapping was repeatedly performed during the last five months of life. The immediate relief was marked, but the liquid speedily reaccumulated.

CASE 4.—The tapping was performed twice during the last two months of life with immediate relief, but the dropsy soon returned.

The facts in ten non-fatal cases were as follows :—

CASE 1.—Tapped repeatedly during five months, and, when last seen, the abdomen was distended with liquid, and there existed much emaciation and debility.

CASE 2.—Tapped with great immediate relief. Liquid flowed from the puncture for several days. Twenty-two days afterwards the patient had no reaccumulation of liquid, and was discharged from the hospital.

CASE 3.—Tapped, and liquid flowed from the puncture for several days. Four months afterward, when last seen, there had been no return of the dropsy, and the patient reported quite well.

CASE 4.—Tapped with great relief. Three months afterward, when last seen, no return of dropsy; the patient reporting and looking well.

CASE 5.—Tapped twice in course of three or four months. Subsequent history not known.

CASE 6.—Tapped, for the first time, eighteen months before the case came under my observation. Prior to the dropsy the patient had hæmatemesis. The dropsy had existed for two or three months before the first operation, and had been once removed by hydragogue cathartics. In the course of eighteen months tapping was repeated thirty times. The patient had come to regard the operation as a trivial affair, and the day after its performance was accustomed to go about as usual. When I saw him he was able to take pretty active exercise, but was quite anæmic; the abdomen was then filled, and the abdominal veins largely dilated. The subsequent history is not known.

CASE 7.—The patient, when admitted into hospital, was greatly prostrated, and tapping was resorted to when the case seemed to be near a fatal ending. The immediate relief was marked, and the patient's life appeared to be saved by the operation. Improvement was progressive, but after a month the abdomen filled rapidly, and tapping was again employed. The operation was repeated twice during the following month, and the patient then left the hospital extremely feeble.

CASE 8.—Tapped six months ago, and up to the present time there has been no return of the dropsy. The health of the patient is now good.

CASE 9.—Tapped a few weeks ago, and the dropsy is now returning.

CASE 10.—Tapped quite recently with marked immediate relief.

From the foregoing facts I draw the following conclusions: 1. Tap-

ping may be resorted to as a palliative measure when the condition of the patient is such that only temporary relief is to be expected. We need not be deterred from the operation by the debility of the patient. So far as these facts are concerned, they afford no support to the notion that removing the liquid will tend to produce exhaustion in consequence of more rapid subsequent effusion. On the contrary, life appears to be prolonged by the operation under these circumstances. 2. In a certain proportion of cases the dropsy returns more or less quickly, and if this plan of treatment be adopted, it may be necessary to repeat the operation many times. The repetitions, however, are innocuous. Of this, the case in which it was performed thirty times in 18 months is a striking illustration. 3. In some cases the dropsy does not return for a considerable and even a long period after the operation. Of this No. 2 of the fatal, and Nos. 3, 4 and 8 of the non-fatal, cases are examples, the dropsy in the first case not returning for ten weeks, and in the other three cases not having returned at the end of 4, 3 and 6 months.

As regards the employment of tapping, the views inculcated by medical writers and generally entertained are, that it is to be resorted to only when the abdominal distension occasions great distress or danger, and not until the indirect means of diminishing the effusion have been thoroughly tried; that the effusion generally goes on more rapidly after the liquid has been removed by puncture, than while it was allowed to remain, or when it is lessened by diuretics and hydragogue cathartics, and that the operation involves danger if the system be much prostrated. I have been led to believe that these views are erroneous. By tapping we effect promptly, without perturbation and without impairing the vital powers, the same object which we strive to accomplish by indirect means when we employ diuretics and hydragogue cathartics, measures which are generally ineffectual, which disturb the digestive functions, and enfeeble the powers of life. The operation is trivial, and involves little or no risk of accidents or of peritoneal inflammation. There is no danger from increased rapidity of effusion directly after the operation. The patient is spared not only the inconvenience and distress, but the permanent injury caused by the prolonged pressure of the liquid upon the abdominal and thoracic viscera, and he is in a condition more favourable for other remedies than those which have special reference to the removal or diminution of the dropsy. Clinical experience shows that in some cases, even when the dropsy is dependent on cirrhosis, the liquid does not accumulate for weeks and months after the operation. It remains to be ascertained if in any cases in which it has not yet returned, the exemption will prove to be permanent. A larger accumulation of cases in which the operation was resorted to early is desirable; but upon rational grounds and with my present amount of experience, it seems to me judicious to resort to tapping so soon as the accumulation of liquid is sufficient to occasion much inconvenience, adopting this direct method in lieu of the

indirect means, provided the latter do not happen to prove immediately efficacious, and repeating the operation whenever the abdomen becomes again distended to the same extent.

The management of hydro-peritoneum involves measures other than those which relate specially to the object thus far considered, viz., the removal or diminution of the dropsical effusion. In studying my cases with reference to causation, I was led to conclude that the dropsy is often measurably due to causes which are remotely operative, that is, causes co-operating with the pathological condition on which the dropsy is immediately dependent. These remote or accessory causes act by impoverishing the blood, and impairing the forces which carry on the circulation. We may be able to control these causes and remove their effects, although the immediate cause of the dropsy be beyond our control. The latter may not alone be sufficient to perpetuate the dropsy, when divested of the remote or accessory causes. Here, then, is an important part of the management. And the first point relates to the habit of spirit drinking. This being the special cause of the lesion which is the proximate pathological condition in the majority of cases (cirrhosis), the abatement of this cause will be likely to prevent the further progress of the lesion. But, aside from this result, the habit of spirit drinking favours the occurrence of dropsy by disturbing the digestive system, and inducing general debility. I shall presently cite two cases in which the interruption of this habit was alone or chiefly sufficient for the disappearance of the dropsy. If the patient be not much debilitated, it is perhaps best that alcohol in any form be abstained from; but if sustaining measures are called for, wine or malt liquors should, if practicable, take the place of spirit; and if the interdiction of the latter cannot be enforced, the importance of not taking it upon an empty stomach should be impressed.

Tonic remedies have appeared to me to be useful in the management of hydro-peritoneum. The citrate of iron and quinia is the remedy which I have almost universally given. In seven of my cases the histories render it probable that this remedy contributed to the improvement which took place. The facts bearing on the supposed utility of this remedy in these cases are as follows:—

CASE 1.—The patient was discharged from hospital free from dropsy, and reporting well enough to return to work; the medicinal treatment having consisted of the citrate of iron and quinia, with the exception of a diuretic for ten days.

CASE 2.—Precisely the same facts, only the diuretic was continued but nine days.

CASE 3.—After free purging with elaterium, the only remedy employed was the citrate of iron and quinia. Under this remedy there was marked improvement, and the patient reported well enough to be discharged, but he was not entirely free from the dropsy.

CASE 4.—No therapeutic measures were employed, save the use of the citrate of iron and quinia. The patient was discharged from hospital free from dropsy.

CASE 5.—Great improvement, the dropsy having nearly disappeared when the patient was last seen. And in this case the quinia and iron, and the tincture of sesquichloride of iron, with bismuth and opium for diarrhœa, constituted the treatment.

CASE 6.—After tapping, the citrate of iron and quinia constituted the treatment. Patient discharged from hospital free from dropsy, and quite well, four months after the tapping.

CASE 7.—The dropsy disappeared in a few weeks, without tapping, under the use of the citrate of iron and quinia; neither diuretics nor hydragogues having been given, and the patient remained free from the dropsy when last seen, two months after coming under observation.

We cannot estimate, in these cases, the importance to be attached to the interruption of the habit of spirit-drinking, and to better hygienic conditions in hospitals than those to which the patients may have been previously accustomed. It is fair to presume that the tonic medication was not without some effect. I should, perhaps, speak more confidently of its value, were it not that improvement and recovery may take place under hygienic treatment without any medication. Of this my cases furnish the two following illustrations:—

CASE 1.—The patient was admitted into hospital a month after the dropsy commenced. The abdomen was greatly distended. He was at first purged with elaterium, but as the purging was not followed by any reduction of the dropsy, and occasioned much prostration, this remedy was not repeated, and a quarter of a grain of the extract of belladonna, three times daily, was prescribed as a placebo. I intended to resort to tapping, but the operation was deferred for several days, and, in the meantime, there was distinct general improvement with diminution of the size of the abdomen. The dropsy rapidly disappeared, and in a short time he reported well enough to return to work and was discharged. The extract of belladonna was the only remedy employed in this case.

CASE 2.—This case has been already given (case of Mrs. W., *vide* page 319) as an illustration of complete recovery, the patient having been in excellent health for more than eighteen months. After the employment of elaterium, iodide of potassium and the citrate of iron and quinia, the dropsy remaining unaffected, she recovered on going into the country and taking out-door exercise, all medication having been suspended.

Of the use of mercury in hydro-peritoneum I can say nothing from my own experience. In some of my cases mercurialization had been produced, prior to their coming under my care, without any benefit. I should expect only injury from a remedy which induces anæmia.

In cases in which diarrhœa exists, a practical point relates to the propriety of endeavouring to relieve this symptom. Does not its continuance tend to lessen the dropsy? It is generally supposed to have this effect, and therefore its continuance is regarded as desirable. I have been led to doubt the correctness of this opinion, and to think that, in some cases at least, by increasing the general debility, diarrhœa contributes to the increase of the dropsy. In one of my cases the patient was progressively improving

nnder tonic medication, but was troubled with chronic diarrhœa, and I resolved to see what would be the consequence of arresting the diarrhœa. Bismuth, and afterward opium, were prescribed for this end, and proved effectual. The improvement in this case was not less progressive after the diarrhœa was arrested than before.

Another practical point relates to the treatment of œdema of the genital organs by scarification. The œdema in this situation sometimes becomes excessive, but the parts cannot be scarified without risk of serious consequences. Two of my cases illustrate the correctness of this statement. In one of these cases mortification ensued, and the patient died before sloughing took place. The other case came under observation after sloughing of the greater part of the scrotum had taken place, leaving the testicles exposed. After the scarification the patient was tapped, the space left by the slough granulated kindly, and when I last saw the patient the part had nearly healed. This unexpected cicatrization seemed to me to furnish a striking illustration of the general improvement resulting from the removal of the dropsical effusion by tapping.

To sum up in a few words, the management of hydro-peritoneum, so far as it has been considered, the first object generally being to effect the removal or diminution of the peritoneal effusion, we may make cautious trial of diuretics and hydragogue cathartics. If these means do not prove promptly efficacious (as they will very rarely do), it is useless to persist in the former (diuretics), and injurious to continue the latter (hydragogues). Tapping should be resorted to so soon as the abdomen becomes distended, and may be repeated as often as the effusion accumulates sufficiently to produce distension. If the system be not much debilitated, all alcoholic beverages are to be interdicted; and if these seem to be required, or the patient have not sufficient resolution to forego their use, wine and malt liquors should be substituted for spirit. If spirit must be taken, it should be taken diluted and not on an empty stomach. Tonic remedies are to be prescribed. A nutritious diet is important, and the quantity of liquid ingested should be as much restricted as practicable, the object being to render the blood rich in quality, without increase of quantity, avoiding anæmia and hydræmia. In general terms, the hygienic conditions should be as good as possible. If diarrhœa exist, it may be relieved by appropriate remedies, in some cases, at least, without injury, if not with benefit. It is dangerous to resort to scarifications to relieve excessive œdema of the genital organs.

COURSE AND TERMINATION OF HYDRO-PERITONEUM. PROGNOSIS.—Of the 46 cases which have been analyzed, 24, as already stated, either ended fatally under my observation, or the patients were known to have subsequently died. Of the 22 non-fatal cases, in 8 there had been no improvement when the patients were last seen or heard from. Doubtless in most,

if not all of these cases the termination was fatal. In 4 cases, when the patients were last seen, or heard from, more or less improvement had taken place, but the dropsical affection continued. In 10 cases, the dropsy having disappeared or been removed by tapping, the patients were free from the affection when last seen or heard from. The period during which it is known that they continued exempt from dropsy, varies from a few weeks to eighteen months. In only two of the cases is the present condition of the patients known, nor, excepting these two cases, is it known whether the patients are living or dead. In one of the two cases just referred to, the patient is now well after a period of over eighteen months from her recovery, and in the other case the patient is in comfortable health eight months after recovery. Exclusive of these 2 cases, the patients were in no case known to have remained free from dropsy for a longer period than three months, and in most of the cases only for a few weeks. They were hospital cases, and after the removal of the dropsy, with more or less general improvement, they were discharged, and have not been heard from since their discharge. It is by no means fair to consider these 8 cases as having terminated in recovery. It is highly probable that in most of the cases the dropsy subsequently returned. Of the two excepted cases, in one the period of exemption from a return of the dropsy (eight months) is hardly long enough to consider the recovery as permanent; so that, in fact, out of the forty-six cases analyzed, I can state positively that recovery has taken place in but a single instance. This is the case of Mrs. W., which has been given in full.

The duration of the disease, dating from the commencement of the dropsy, in the fatal cases, varied from six weeks to seventeen months. The average duration in 16 cases is about five months. The duration of the dropsy in the cases in which it was removed and did not return while the patients were under observation, varied from one month to four months.

The prognosis, as regards permanent recovery, it is evident, is extremely unfavourable. But with reference to this point, a collection of cases in which patients remained under observation for a longer period after apparent recovery, is desirable. We cannot consider a patient as having recovered, although he may have been exempt from recurrence of effusion for weeks or months, if pathological conditions remain which will inevitably, sooner or later, reproduce the dropsy. The facts developed by this analysis, however, show that in a fair proportion of cases the dropsy may be removed, and not return for weeks or months, the patient, in the meantime, regaining apparent health. We are warranted, therefore, under favourable circumstances, in holding out encouragement for this result with the possibility of permanent recovery.[1]

[1] Since this article was written, a case has come under my notice of much interest as regards apparent recovery after tapping, and reproduction of the dropsy after the lapse of several years. The patient was admitted into Bellevue Hospital with

The most favourable circumstances are those which go to show that the dropsy is dependent on some functional condition, and not on hepatic lesion; the cases, however, in which we are warranted in coming to this conclusion, are exceedingly infrequent. But assuming the existence of structural disease of the liver, circumstances are favourable which render it probable that the dropsy depends, not exclusively on the hepatic disease, but, to a greater or less extent, on associated morbid conditions which we are able to control, such as anæmia, general debility, diarrhœa, intermittent fever. In other words, the prognosis is unfavourable in proportion as we have reason to believe that the dropsy is exclusively due to irremediable lesion of the liver. If the liver have undergone structural change, permanent recovery is not to be expected, but it is to be borne in mind that dropsy may be removed and not return for an indefinite time, notwithstanding a certain amount of immediate hepatic lesion. When, therefore, there is reason to believe that dropsy involves the existence of cirrhosis (which is true of the vast majority of cases), although we cannot look for permanent recovery, we may hope, if the circumstances of the case are not otherwise unfavourable, that, after the removal of the dropsy, the patient may be exempt from a recurrence of the affection for a long period, and that, in the mean time, with judicious management, a comfortable state of health may be secured. The liver, doubtless, like other important organs, has a functional capacity exceeding greatly the necessities of the economy. Like the lungs, kidneys, stomach, heart, etc., it may be damaged to a greater or less extent, and yet be competent for the duty required of it. As proof of this, in fatal cases of cirrhosis, death generally takes place by asthenia, induced by the serous transudation, the disturbance of the functions of the thoracic and abdominal organs by the pressure of the liquid, the difficulty attending the introduction into the general circulation of the nutritious supplies in the portal blood, etc., and not from the reabsorption of bile or the retention in the blood of excrementitious biliary principles. Assuming that the liver has received a certain amount of damage from structural change, there are two great ends to be desired: *First*, that, if possible, further damage shall not occur; and, *Second*, that the powers of the system may be preserved, so as to tolerate, as well and as long as possible, the structural change already existing and which must continue.

hydro-peritoneum which had existed for two months, having been developed after intermittent fever. Eight years ago he had this disease, and at the end of four months was tapped. The tapping was repeated after an interval of two weeks. There was no return of the dropsy for six years, and during that time he had good health. Two years ago the dropsy returned, and he had hæmatemesis. Five weeks from the commencement of the dropsy he was tapped. The dropsy returned, but disappeared under the use of medicines, and he remained free from it until two months ago. He has continued to drink spirits more or less prior to, and ever since the first occurrence of the dropsy.

Circumstances which preclude much expectation of improvement, are: the coexistence of cardiac or renal disease; considerable emaciation; sufficient debility to keep the patient in bed; jaundice; greatly impaired appetite and digestion; speedy reaccumulation of liquid after tapping. When more or less of these unfavourable circumstances are present, the physician can hardly hope to do more than to retard the progress toward a fatal termination.

In conclusion, unpromising as are the majority of the cases of hydroperitoneum, I cannot but believe that, as regards prolongation of life and as much improvement of health as is compatible with existing structural disease, the success of medical practice would be enhanced by employing less than has been the custom of physicians, diuretics, hydragogue cathartics, and other depressing remedies, by resorting earlier than is usually done to tapping, and by a greater reliance on tonic medication, together with hygienic measures to invigorate and strengthen the system.

ART. III.—*On Gold Dust and Iron Filings, as an Antidote for Corrosive Sublimate.* By CHRISTOPHER JOHNSTON, M.D., Baltimore, Md.

IN the year 1841 a rejected lover, at that time a visitor in Baltimore, committed suicide by taking a large dose of the corrosive chloride of mercury. The case fell into the hands of Dr. Thomas H. Buckler, who employed, unavailingly, all the known antidotes for this destructive agent, and had the misfortune to see his patient die in great agony. The failure of art to relieve made a strong impression upon Dr. Buckler, and he forthwith instituted experiments with the view of ascertaining by observation the efficacy and value of the various articles used or proposed to counteract the poisonous effects of the mercurial salts.

In the course of these experiments upon pigs and dogs, it occurred to him to magnify the *galvanic test* into an antidote—for, said he, if the corrosive chloride in solution, being placed on a bright gold surface, and touched with an iron point which is also brought in contact with the gold, undergoes decomposition, there is no reason why gold and iron in the form of powder, as exposing great surface, should not also separate chlorine and mercury in combination in the living stomach. Besides, the elements are instantly appropriated by the antidotal agents, "the mercury attaching itself to the negative electrode, namely, the gold, while the chlorine unites with the iron of the positive electrode to form chloride of iron; and thus, for a highly dynamic substance, we substitute a comparatively inert amalgam of gold and a harmless chloride of iron."

Accordingly into the stomach of pigs and dogs he introduced poisonous